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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,849	08/14/2001	Brian Christopher Hart	2001-0128.00	9848

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EXAMINER	
CULBERT, ROBERTS P	
ART UNIT	PAPER NUMBER
1763	3

DATE MAILED: 10/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/929,849	Applicant(s) HART ET AL.	
	Examiner Roberts Culbert	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *8-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 12-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-18* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-7 and 12-18, drawn to a process, classified in class 451, subclass 38.

II. Claims 8-11, drawn to a product, classified in class 347, subclass 47.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as laser ablation.

During a telephone conversation with Jacqueline Daspit on 8/21/02 a provisional election was made with traverse to prosecute the invention I, claims 1-7 and 12-18. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-11 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the

application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the resistive, conductive and insulative layers defining individual semiconductor components must be shown or the features canceled from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,402,301 to Powers et al. in view of U.S. Patent 5,454,928 to Rogers et al. and as further evidenced by U.S. Patent 5,105,588 to Verley et al. and U.S. Patent 6,045,214 to Murthy et al. Rogers teaches a method for forming vias completely through a circuit substrate using laser

drilling. Before the step of laser drilling, Rogers teaches the application of a water-soluble polymer layer to protect the surface from debris (Column 2, Lines 52-55). The coating is removed along with the debris after the drilling step (Column 2, Lines 59-61).

Rogers does not teach the use of grit blasting to form the vias, and does not show the formation of vias in an ink-jet semiconductor chip. Powers does show formation of vias in an ink-jet semiconductor chip using grit blasting (Colunm1 Lines 50-52). The semiconductor chip is made from silicon (Column 3, Lines 55-56), and the vias are formed through the entire substrate (Column 4, Lines 12-13). It would have been obvious to one of ordinary skill in the art at the time of invention to use the protective layer of Rogers in the grit blasting step of Powers in order to protect the surface of the substrate from debris, since Rogers teaches that other means of forming vias may be used with the process disclosed (Column 2, Lines 63-65), and grit blasting is a preferred method for forming vias in an ink-jet semiconductor chip as shown by Powers. Further, grit blasting and laser drilling are art recognized equivalents for the purpose of forming vias in an ink-jet semiconductor chip as shown by Verley (Column 1 Lines 16-34), and it has been held that substitution of one art-recognized equivalent for another is *prima facie* obvious. *In re Fout*, 297, 213 USPQ 532 (CCPA 1982).

Regarding the various layers associated with an ink-jet semiconductor chip, it is well known in the art that an ink-jet semiconductor chip contains resistive, conductive, insulative, and protective layers as shown by Powers (Column 1, Lines 34-39). Powers also teaches the use of a photoresist layer (Column 5, Lines3-6). The application of a photoresist layer to an ink-jet semiconductor substrate is a well-known step to those of ordinary skill in the art as further evidenced by U.S. Patent 6,045,214 to Murthy et al. (Column 4, Lines 1-8).

Regarding Claim 6, Verley teaches the use of aluminum oxide and silicon carbide for grit blasting vias in a silicon ink-jet substrate (Column 1, Lines 46-47). It would have been obvious to one of ordinary skill in the art at the time of invention to use the particles of Verley in order to suitably form vias in the silicon substrate using grit blasting.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers in view of Rogers, Verley and Murthy and in further view of U.S. Patent 4,950,583 to Brewer et al. As applied above, Powers, Rogers, Verley and Murthy disclose the method of the invention substantially as claimed, but do not show the use of a silane adhesion promoter. Brewer teaches the use of silane adhesion promoters in the application of a photoresist to a silicon substrate (Column 1, Lines 36-41). It would have been obvious to one of ordinary skill in the art at the time of invention to use the adhesion promoter described in Brewer in order to increase the adhesion of the photoresist to the substrate.

Claims 2,3,5,7,8, 9,10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers, in view of Rogers, Verley, Murthy and Brewer, and in further view of U.S. Patent 6,448,313 to Patel. As applied above, Rogers, Powers, Verley, Murthy and Brewer disclose the method of the invention substantially as claimed, but Rogers teaches the use of a water-soluble polymer as a temporary protective layer. Rogers does not show the use of a polyacrylamide layer. Patel teaches the use of polyacrylamide in a temporary protective layer. Patel further teaches that polyacrylamide is a water-soluble polymer. (Column 2, Lines 22-26). It would have been obvious to one of ordinary skill in the art at the time of invention to use the water-soluble polymer of Patel in order to suitably form a temporary protective coating.

Regarding Claims 10 and 11, the claims differ from the prior art only by specifying the thickness of the adhesion promoter, photoresist and polyacrylamide layers. However, no evidence is provided to indicate the criticality of the stated range. The recitation of the dimensions of a claimed invention are not sufficient to patentably distinguish over the prior art unless it can be shown that the recited changes produce a new or unexpected result. Even where the claimed ranges and prior art ranges do not overlap, but are close enough that one skilled in the art would have expected them to have the same properties, a *prima facie* case of obviousness exists. *In re Wertheim*, 191 USPQ 90 (CCPA 1976). *Titanium Metals Corp. of America v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers in view of Rogers, Verley and Murthy, and in further view of U.S. Patent 5,677,063 to Kamiyama et al., and U.S. Patent 6,409,312 to Mrvos et al. As applied above, Rogers, Powers, Verley and Murthy disclose the method of the invention substantially as claimed, but do not teach spin coating the protective layer or the finishing steps of attaching nozzle plates, dicing the wafer, connecting TAB circuits, and connecting the nozzle plate/chip assemblies to printhead bodies to form printheads. Kamiyama teaches that spin coating, blade coating and roll coating are known methods for the purpose of forming a thin layer of polyacrylamide (Column 27 Lines15-21). It would have been obvious to one of ordinary skill in the art at the time of invention to use spin coating in order to suitably deposit a water-soluble protective layer.

Regarding the step of grit blasting, it would have been obvious to one of ordinary skill in the art at the time of invention to grit blast the vias from the side of the wafer that does not

contain the resistive conductive and insulative layers in order to prevent the particles from damaging the components.

The finishing steps of attaching nozzle plates, dicing the wafer, connecting TAB circuits, and connecting the nozzle plate/chip assemblies to printhead bodies to form printheads, are well-known in the art of forming ink jet printheads as shown in Mrvos (Column 3 Lines 22-27). It would have been obvious to one of ordinary skill in the art at the time of invention to apply the same finishing steps in order to complete the printhead assembly in the well-known manner.

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers in view of Rogers, Verley, Murthy, Kamiyama, and Mrvos, and in further view of Patel. Rogers, Powers, Verley, Murthy, Kamiyama, and Mrvos disclose the method of the invention substantially as claimed, but Rogers teaches the use of a water-soluble polymer as a temporary protective layer. Rogers does not show the use of a polyacrylamide layer. Patel teaches the use of polyacrylamide in a temporary protective layer. Patel further teaches that polyacrylamide is a water-soluble polymer. (Column 2, Lines 22-26). It would have been obvious to one of ordinary skill in the art at the time of invention to use the water-soluble polymer of Patel in order to form a temporary protective coating.

Regarding Claims 13 and 16, Verley teaches the use of aluminum oxide and silicon carbide for grit blasting vias in a silicon ink-jet substrate (Column 1, Lines 46-47). It would have been obvious to one of ordinary skill in the art at the time of invention to use the particles of Verley in order to form vias in the silicon substrate using grit blasting.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers, in view of Rogers, Verley, Murthy, Kamiyama, and Mrvos.

The above-cited claims differ from the prior art only by specifying the thickness of the photoresist and polyacrylamide layers. However, no evidence is provided to indicate the criticality of the stated range. The recitation of the dimensions of a claimed invention are not sufficient to patentably distinguish over the prior art unless it can be shown that the recited changes produce a new or unexpected result. Even where the claimed ranges and prior art ranges do not overlap, but are close enough that one skilled in the art would have expected them to have the same properties, a *prima facie* case of obviousness exists.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (703) 305-7965. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

October 24, 2002

GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700